

Charge No.: 1503  
Program Title: Modified Smoking Materials  
Period Covered: July 1-31, 1980  
Project Leader: G. D. Keritsis

### I. Low Nitrogen Tobacco

The alkaline extraction of cured burley and bright tobacco removes over 83% of the non-nitrate nitrogen but at the expense of a 70% tobacco weight loss. Efforts are being made to recover nitrogen-free tobacco solubles for reconstitution using such techniques as acid precipitation, ultracentrifugation and ultrafiltration. Several samples were prepared by these treatments and submitted for analysis.<sup>1</sup>

### II. Denitration of Tobacco Solubles using Electrodialysis (ED)

During the denitration runs with Park 500 tobacco solubles in the pilot plant electrodialysis unit, it was noticed that certain solid residues were accumulating in the solubles and brine manifolds adjacent to the unit's cathode plates. This problem was not evident when the laboratory unit was tested. After a thorough investigation, it is now thought that this build-up is due to the exposure of the cathode plates in the pilot unit to the tobacco solubles and brine manifolds. To study this phenomenon further the laboratory unit was modified to produce similar conditions and the results were comparable to the pilot unit.<sup>2</sup> Consequently, Ionics supplied new cathodes having isolated plates for a trial run beginning August 6, 1980 by project 1307 personnel.

Additional efforts are being made to improve the ED process by pretreating the tobacco solubles in order to reduce its colloidal nature which should allow a more uniform flow at higher levels of tobacco solids and  $\text{NO}_3\text{-N}$ . This will permit a more efficient rate of denitration with a smaller ED unit.

Some of these pretreatments of the tobacco solubles involve the neutralization of the colloidal charges followed by ultrafiltration or centrifugation. Laboratory studies indicate that the colloidal materials in the tobacco solubles responsible for the high viscosities are higher than 50,000 in molecular weight; and that at 35 psi, 78% (w/w) of the solubles containing 82% of the  $\text{NO}_3\text{-N}$  pass through a 50,000 molecular weight cut off CA ultrafiltration membrane.<sup>3</sup> A small pilot unit equipped with 1,000 and 20,000 molecular weight cut off polysulfone UF membranes has been obtained for evaluation at higher pressure (50-100 psi).

ED systems that allow the selective removal of ions (anions or cations) from the tobacco solubles are also being studied with the use of the laboratory ED unit and existing membranes.<sup>4</sup>

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### III. RCB Studies

It has previously been reported that the RCB samples produced in the laboratory are four to five times stronger than the BL production material and that the laboratory samples containing standard amount of stems are twice as strong as the similarly processed samples that did not contain stems.<sup>5</sup>

This study was then followed with production RCB slurries which were cast in the laboratory at the standard 17.5% solids and over a range of 8-15% solids. The sheets that made at the lower solids were found to be the strongest (2.2 kg/in with 8% solids vs 1.3 kg/in with 15% solids).<sup>5</sup> This indicates that the BL production slurry is sufficiently refined and the problem is probably due to the inability of the high solids slurries to "heal" the deformities caused during drying. This phenomenon is expected to be magnified by the production method of drying (forced hot air circulation) which causes a pH change in the cast slurry by removing NH<sub>3</sub>. These studies are being continued in order to produce the proper samples with approximately production conditions prior to recommending changes for evaluation at the BL PP, and in production. In the meantime, an effort is also being made to determine the minimum levels of stems or other additives that are needed to produce acceptable RCB.

### IV. References

1. Susan Evans Notebook No. 7318 pp 96, 100, 101, 103
2. H. A. Jones Notebook No. 7347 p 165
3. Susan Evans Notebook No. 7318 pp 102, 104-107, 109, 112-113
4. H. A. Jones Notebook No. 7347 pp 161-163, 166
5. "Monthly Progress Reports", June 1-30, 1980 under charge No. 1503
6. J. W. Leik Notebook No. 7395 pp 90-93, 102, 103 and 105

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